IN THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA,

Plaintiff,

vs. 4:05-CV-00329-TCK-SAJ

TYSON FOODS, INC., et al,

Defendants.

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VOLUME I OF THE VIDEOTAPED DEPOSITION OF BERTON FISHER, PhD, produced as a witness on behalf of the Defendants in the above styled and numbered cause, taken on the 3rd day of September, 2008, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

EXHIBIT 45

been applied to a stream or the lake?
A In the sense of doing a causation pathway analysis as Roger Olsen has done, yes. In terms of looking at a single field all the way to a stream or lake, no. 11:00AM
Q Okay. Now, with respect to edge of field samples, you'll agree with me that the mere fact that a constituent has run off of a pasture and been collected in an edge of field sample does not guarantee that that constituent reaches a stream, 11:00AM the Illinois River or Lake Tenkiller; correct?
A It says that constituent is on its way in that direction.
Q Do they all get there?
A They all get there eventually. 11:01AM
Q They all get there? Everything that runs off the edge of the field eventually makes its way to Lake Tenkiller; is that your opinion?
A I would say that everything that runs off the edge of a field ultimately gets into drainage 11:01AM because it --
Q My question --
A There's some fraction that does.
Q Some fraction from every field or some fraction from all of the fields? 11:01AM

A What's the difference between some fraction from every field and some fraction from all the fields?

Q Well, the difference is between which a particular contract grower's actions are contributing or not. 11:01AM

MR. GARREN: Object to form.

A Some fraction of all runoff in my opinion would make it into the drainageways and into Lake Tenkiller. 11:01AM

Q What have you done to test that opinion?

A We certainly see that there are waste as you see the chain -- the pathway analysis. You see that material is disposed in fields. You see that edge of field samples contain high concentrations of 11:02AM phosphorus and certain metals that are indicative of poultry waste. You see that those materials are also in stream sediments. You see that the phosphorus numbers are going into Lake Tenkiller and you see an association between, for example, chicken 11:02AM house density and phosphorus in high flow samples. I think that the -- that that analysis is pretty conclusive that material that was put on the ground as poultry waste ends up in Lake Tenkiller. Now, if you look at any individual field, if any material 11:02AM

balance under the direction of Bernie Engel with my input.

Q Did you undertake any statistical or scientific analysis that would allow you to offer an opinion of your own regarding the relative contribution of poultry litter to phosphorus loads? 11:43AM

A Well, simply reviewing the information that's present in the literature, reviewing the information from Meagan Smith and reviewing the data in the sediment cores, along with the population changes in poultry in the basin, I guess you could say I did because I looked at a coalescence or a concordance of information between what I saw in sediment cores, poultry populations and what I was getting in terms of mass balance issues from Meagan Smith and Bernie Engel, and so in that sense, yeah, I mean I have an independent line of evidence that supports the mass balance numbers. 11:44AM 11:44AM

Q Okay. Have you been asked to determine a quantitative contribution of poultry litter to the phosphorus loads in the Illinois River watershed? 11:44AM

A I was asked to assist in doing that. I wasn't asked to do it.

Q As we sit here today, Dr. Fisher, do you have a quantitative opinion as to the relative 11:45AM

contribution of poultry litter to phosphorus loads in the Illinois River or Lake Tenkiller?

A I would adopt the opinions that have been expressed by the other experts in this matter.

Q Do you have an opinion that's based on your own independent evaluation of that question? 11:45AM

A With respect to --

MR. GARREN: Object to form.

A I would say based upon my sediment core information, that I have data that supports their estimates. 11:45AM

Q Well, what's your opinion as to the relative contribution of poultry litter as either a percentage or however else you want to quantify it?

A Overwhelmingly dominant. 11:45AM

Q Well, give me a number.

A In excess of 70 percent.

Q In excess of 70 percent, and you base that on what?

A I base that upon the mass balance work that was done by Meagan Smith under Dr. Engel's direction and with my input, and I base that upon the extremely strong correlation between total phosphorus concentration in the lake sediment cores over time that corresponds in time to the buildup in 11:45AM 11:46AM

poultry population within the Illinois River watershed.

Q You discuss sediment cores in your expert report; correct?

A I do. 11:46AM

Q Can you point me in your report where you've expressed this 70 percent contribution --

A I've not expressed --

Q I'm sorry. Hang on. Let me finish. Based upon your review of the sediment cores? 11:46AM

A Okay. You asked me here if I would offer an opinion, and I did. Did I discuss the specifics with respect to contribution from the sediment cores, no.

Q Okay. That's an opinion that you came up with today? 11:46AM

A Well, that's an opinion that I have adopted and rely upon the opinions of others to generate that information.

Q One of the others you mentioned is Meagan Smith and her mass balance study? 11:47AM

A That's correct.

Q Have you reviewed that study?

A I have.

Q Does that study purport to show the relative 11:47AM

contribution of poultry litter to phosphorus loads in water?

A No.

Q In Opinion No. 4 you use the term primary to describe poultry litter, a primary or the primary contributor. Do you see that? 11:47AM

A Yes.

Q What do you mean by primary?

A Well, that they're the largest source of contamination of soils with phosphorus within the watershed. 11:47AM

Q So your definition of primary is the largest; is that fair?

A Source, that's fair.

Q So depending on how many sources you have, largest could be 70 percent or it could be 30 percent, just the largest? 11:47AM

A Well, sure. I mean, the largest is the largest, sort of a plurality, but in this instance, the number of poultry units is so enormous in this watershed, that there is no question, certainly in my mind, that they are the primary contributors to phosphorus in soils, surface waters, groundwaters and sediments. 11:48AM

Q And you base that on the number of poultry 11:48AM

farms?

A I base that upon the mass of material disposed and the concentration of phosphorus in that material, as well as a consideration of other sources, not only the mass balance that Meagan Smith did, and although it's not done in the same way, the same conclusions or essentially the same conclusions are drawn by University of Arkansas experts and the paper by Slaton and others in 2004 published in the Journal of Environmental Quality. I don't think there's actually any, and I mean any, scientific controversy as to the source of phosphorus that's entering the Illinois River watershed from extrinsic sources. 11:48AM 11:49AM

Q There's no controversy that it originates from multiple sources; correct? 11:49AM

A There's no controversy that the overwhelmingly dominant source is poultry. There also, Mr. George, would be no controversy that there are some other sources. 11:49AM

Q What other sources did you investigate, Dr. Fisher?

A The other sources that were investigated --

Q Hang on. What did you investigate?

A That I investigated? 11:49AM

water?

A Well, it works like this: The feed that is given to the poultry contains phosphorus that is imported into the watershed. That phosphorus comes from extrinsic sources. The cattle, on the other hand, are dominantly living on forage that is being grown with phosphorus that's already been applied to fields largely or significantly through poultry waste. So the cattle are recycling phosphorus in terms of mass balance; whereas, the poultry waste is a contribution from an external source. It's just like economics. You'd rather get money from outside the city than recycling it inside the city if you want to grow wealth, and that's pretty much what has happened here. 11:56AM

Q Let's go to Opinion No. 6, Page 18 of your report. Your Opinion No. 6 is that the population of poultry within the Illinois River watershed has shown an overall increase since at least 1950; correct? 11:57AM

A That's correct.

Q Do you agree that the population of cattle in the Illinois River watershed has shown an overall increase since at least 1950?

A The pattern is quite different. 11:57AM

how active they are and then some way of relating poultry houses to waste production, but that's at one time slice. To get back in time, then you're required to look at the number of poultry that are allocated in the watershed and then estimate the waste produced by those birds based upon production conditions as they existed at that time, and that's something Meagan Smith worked on. 12:20PM

Q Dr. Fisher, have you quantified the amount of poultry litter generated in the Illinois River watershed by farms under contract with the defendants named in this lawsuit? 12:20PM

A With respect to what we call the current state of 2005 roughly time horizon, I believe that's true, that I have. 12:20PM

Q Okay. Can you show me that figure in your report?

A It's Table 6.

Q It's the 354,000 figure?

A Yes, sir. 12:20PM

Q And what time period does that figure apply to?

A That figure applies to -- it's a conservative estimate. It's based -- well, we didn't talk about its basis. Its current time period, basically it's 12:21PM

2005.

Q 2005?

A 2005.

Q Okay. Have you quantified the amount of poultry litter generated in the Illinois River watershed by farms under contract with the defendants named in this lawsuit for any year other than 2005? 12:21PM

A I have not.

Q Has anyone? 12:21PM

A To my knowledge, no, although it possibly could be done with the information that were provided by defendants.

Q But you haven't seen it done yet?

A I have not seen it done yet. 12:21PM

Q I think we need to change the tape.

VIDEOGRAPHER: We are now off the Record. The time is 12:21 p.m.

(Following a lunch recess at 12:21 p.m., proceedings continued on the Record at 1:34 p.m.)

VIDEOGRAPHER: We are now on the Record. The time is 1:34 p.m.

Q Dr. Fisher, could you turn to Page 21, Opinion No. 8 in your expert report? 01:34PM

Q How many active poultry houses were you using for purposes of your calculation of the 354,000 tons of poultry litter?

A The number of active houses that we report here, which are present in Table 4, is 1,917 in roughly the time frame circa of 2005-2006. 2005 is kind of a shorthand for the time. 01:36PM

Q And that is the beginning point of your estimation process, is that right, the 1,917 active poultry houses? 01:36PM

A Yeah. House needs to be one that we identified as being active, that's correct.

Q If your number of active poultry houses in the Illinois River watershed is too high, then would you agree your estimate of poultry litter production would, likewise, be biased high? 01:36PM

MR. GARREN: Object to form.

A Not necessarily. There are a lot of pieces of estimation here. As you can see, in the discussion section this particular mode of estimation produces about 354,000 tons, estimating it based on bird count that Dr. Engel then gives us, about 500,000 tons. So it's higher. So they have to look at that within the context of the nature of the estimate and the fact that this is probably a conservative 01:37PM 01:37PM

to do that, I know you may have evening plans, but if you could find it this evening and then give me an opportunity to perhaps ask a question about it tomorrow, that would be helpful.

A Okay. 01:50PM

Q The other two instances where you observed poultry litter are apparently not as memorable to you; is that fair?

A They are not as memorable.

Q Okay. I assume there was no confrontation or 01:50PM fear on your part associated with those other two instances; is that correct?

A No. That's correct. They were incidental. I didn't photograph those. I was doing other things at the time. 01:51PM

Q On the bottom of Page 24 and then continuing on to Page 25, you make a point to say that poultry litter, excuse me, is broadcast spread on pastures and hayland within the watershed and is not incorporated into the soil surface by tilling; do 01:51PM you see that?

A Yes.

Q Okay. It seems to me you take issue with the fact that poultry litter is not incorporated into the soil surface by tilling. Am I reading that 01:51PM

correctly?

MR. GARREN: Object to form.

A No, you're not reading that correctly. I'm simply recording the fact that it is not.

Q Is it your opinion that poultry litter should be tilled into the soil in the Illinois River watershed? 01:51PM

A I don't have an opinion as to whether or not it should be tilled into the soil. I simply observed that by not tilling it into the soil puts it in a circumstance where it may be more readily transported. 01:51PM

Q You, in connection with your work in this case, Dr. Fisher, have had an opportunity to review nutrient management plans issued by the Oklahoma Department of Ag as well as the Arkansas Natural Resources Department; correct? 01:52PM

A Yes, I have.

Q Do these plans advise users of poultry litter about what they can and cannot do in terms of using poultry litter? 01:52PM

A In a general sense, yes.

Q Have you seen in any of those plans where the Arkansas Natural Resources Commission or ODAFF has instructed users of poultry litter to till it into 01:52PM

the soil?

A I have not.

Q Have you suggested to Attorney General Edmondson or any of the Oklahoma agencies, including the Oklahoma Department of Ag, that they should consider a requirement that poultry litter be tilled into the soil? 01:52PM

MR. GARREN: Object to form.

A No, I have not.

Q Let's look at Opinion No. 10, which I'll read. For the Record, your Opinion No. 10 is waste generated by poultry within the Illinois River watershed has been applied near to where it is generated. Did I read it correctly? 01:52PM

A You did. 01:53PM

Q Okay. Look at Page 26. You are referring to, in the second paragraph, to a dataset that you have reviewed. Do you see that reference for the dataset as a whole?

A No, I do not, Mr. George. 01:53PM

Q Perhaps I can help you. Right there.

A Oh. Yes.

Q What dataset are you referring to?

A Okay. That is the dataset that is based upon the ODAFF records, the Oklahoma Department of 01:53PM

Agriculture, Food & Forestry records.

Q Okay, and based upon your review of that dataset, what, if any, opinions have you reached regarding the typical proximity of land application in reference to where litter is generated? 01:54PM

A Well, it's stated in the report, based upon review of those records, given the constraints on knowing the -- that you needed to know where the waste arose with respect to its public land survey section, where it was disposed knowing the section 01:54PM of disposal, knowing the date of application and how much was applied given in tons and not in any other units, that given those constraints, that approximately 30 percent of the waste that was generated is land disposed in the same square mile 01:54PM in which it was generated. About 60 percent of the waste was disposed within two miles of where it was generated, and 80 percent was disposed within five miles. This is for Oklahoma as a whole.

Q Oklahoma as a whole or the Oklahoma portion of 01:55PM the watershed?

A No. There's a second piece of this statement. That's Oklahoma as a whole. Going in the next sentence, it says, likewise, considering only waste generated within the Illinois River watershed. It's 01:55PM

similar, but the wastes are generated or are disposed somewhat more closely to where they're generated. For sections that could be identified being clearly totally within the Illinois River watershed, about 30 percent of the waste generated was land disposed within the same square mile, so equivalent to the state as a whole, but only 67 and a half percent or 7 and a half percent more of the waste was disposed within two miles of where it was generated, and 80 percent was generated within 3.6 millions, so a little more contiguous to its location of origin than the state as a whole. 01:55PM 01:55PM

Q So do I understand then that you hold the opinion that in the Oklahoma portion of the Illinois River watershed, 20 percent of the poultry litter is disposed at a location that's more than 3.6 miles from where it was generated? 01:56PM

A Yes.

Q Now, the dataset that you're referring to here, is it electronic data or paper records? 01:56PM

A Well, it's both really. The Oklahoma Department of Agriculture, Food & Forestry maintain an electronic dataset. They also retain paper records. In reviewing the electronic dataset, I think we determined that there seemed to be some 01:56PM

Q For the four-year period from 2004 to 2007, based on my math of Table No. 7, Arkansas Natural Resources Commission had documented about 155,000 tons of poultry litter being applied as opposed to generated in the watershed. Do you have any reason to disagree with that? 02:27PM

A Wait a second.

MR. GARREN: Object to form.

A From --

Q Four years. 02:27PM

A Oh, for all counties, for both counties?

Q For both counties in the watershed.

A Well, I think that your math is probably -- if your math is correct, then that's what those numbers would reflect but they're way low. They've got to be low. 02:27PM

Q Do you have any actual records of litter application in the Arkansas portion of the basin other than Table 7?

A No, and evidently no one else does either. 02:27PM

Q So let's talk for a moment about what you can actually document with the Record in terms of poultry litter application. We have the figures in Table 7; correct?

A Uh-huh. 02:27PM

Q For the Arkansas side of the basin, and then where are your Oklahoma documented litter applications? I think it's back further.

A Those --

Q Table 8. I'm talking about applications, not generation. 02:27PM

A I'm looking for Table 8.

Q Page 33.

A Okay.

Q How would I get the total number of tons that you have documented in Table No. 8 as being land applied and the Oklahoma side of the watershed? 02:28PM

A Well, this is the road mileage chart. Let's look at your favorite defendant, Tyson Foods.

Q They are my favorite. 02:28PM

A The location of generation here where the waste is generated, either we don't know where it is. It wasn't listed. It was inside the Illinois River watershed. It was on the border, that is, in some public land survey section bisected by the watershed boundary or clearly outside the watershed. Then we take location of waste disposal. If we take a look there, there is one column that's not given, so you don't know where -- the not given, not given, don't know where it came from, don't know where it 02:28PM 02:29PM

went. You have inside -- generated inside the Illinois River watershed and then disposed on the border inside or outside. So if you wanted to look at the total, well, what we know to be or what is reported to have been disposed of completely within a section within the boundaries of the Illinois River watershed, it would be the column total within Tyson Foods that's under inside Illinois River watershed, was clearly not disposed within the Illinois River watershed would be the column total outside the Illinois River watershed, and what would be -- could be disposed is the border of the Illinois River watershed, could be and could be out, and what we don't know is, of course, the first column total. 02:29PM 02:29PM 02:30PM

Q Okay. So if I wanted to know -- strike that. What's the time period of record for Table 8?

A I have to look. It's -- the time period of record for Table 8 is basically a time period of record in which reporting of this was required. Let's see. I know that that's mentioned in here. Oh, here we go. Disposal records extend from 1999 to 2004. That's on Page 31 under No. 12. That's the basis of that, and most of those are from the later period. 02:30PM 02:31PM

Q 1999 to 2004?
A Right, but the reporting in '99 is pretty desultory. It was not required at that time, and the number of reports seemed to increase a bit through time. So I don't think that these purport to be a full census of disposal. 02:31PM
Q If you look on the preceding page at Page 32 --
A Uh-huh.
Q -- about six or seven lines up from the bottom there's a statement by you that as a consequence a total of 116,401 tons were disposed entirely within the Oklahoma portion of the Illinois River watershed; do you see that? 02:31PM
A Right, according to these ODAFF records. 02:31PM
Q If I added up the column that you pointed me to on Table 8, the Illinois River watershed tons?
A I sincerely hope that you would get that number.
Q That is what was intended. 02:32PM
A Yeah.
Q The tally at the bottom of this chart should be 116,401 tons?
A That's correct.
Q Okay, and those are the sum total of tons 02:32PM

within the Oklahoma portion of the basin for which you have documentation or record of land application of poultry litter from 1999 to 2004; correct?

A Okay. I would say that's the sum total of tonnage that has been reported to the Oklahoma Department of Agriculture, Food & Forestry for things that are clearly -- I mean, they're identified as to their location of disposal. 02:32PM

Q All right, but you don't have any records outside of the Oklahoma Department of Ag as to the tonnages that are land applied within the Oklahoma portion of the basin, do you? 02:32PM

A No.

Q Okay. So based on the records and information you have, this is the most that you've been able to document from those records as land applied from 1999 to 2004 in the Oklahoma portion of the basin? 02:32PM

A Right, remembering, of course, that the records in 1999 are very thin, and that this is probably not a census of -- well, it is not a census of disposal. 02:33PM

Q Okay. So if -- now that we've dealt with the Oklahoma portion, if you'll flip back to Table 7, this is the Arkansas records you have of land application in the Illinois River watershed in terms 02:33PM

of tonnage; correct?

A Yes.

Q Okay. Now, I told you earlier and if you'll trust my math, it's about 155,000 tons over this four-year period. Okay? So do I understand correctly then that if you add those two things together, out of the 354,000 tons that you estimate is produced every year, you can only identify a total of about 280,000 tons over a five-year period that has actually been land applied? 02:33PM

A Well, that's what's been reported.

Q That's the best you can do?

A It's the best anybody can do.

Q Let's change tapes.

VIDEOGRAPHER: We are now off the Record. 02:34PM
The time is 2:34 p.m.

(Following a short recess at 2:34 p.m., proceedings continued on the Record at 2:44 p.m.)

VIDEOGRAPHER: We are now on the Record.
The time is 2:44 p.m. 02:44PM

Q Dr. Fisher, I think you have something to say.

A Yeah, I did. In looking at Footnote 85, it jogged my memory when I looked down at the bottom, thinking about dry waste and volume, dates number for George's and also information pertaining to 02:44PM

Cal-Maine, and for those folks, those defendants, there are application records for liquid waste because that was regulated. There are at least records for application sites for George's as I recall, and then there are documents pertaining to application from Cal-Maine. I just wanted to amend that, that application records would also be considered, not just nutrient management plans. 02:45PM

Q Well, let's step away from that to a related topic. On Page 31, the opinion that you've expressed, and it's based on at least in part Table 8 that we've discussed at length now, is that all defendants have disposed of poultry waste within the Illinois River watershed; do you see that? 02:45PM

A Yes. 02:45PM

Q Okay. Other than perhaps the liquid application records for George's and Cal-Maine that you just referred to, do you have any evidence of the other integrators named in this lawsuit land applying poultry litter within the Illinois River watershed? 02:45PM

A Aside from whatever evidence might exist in the ODAFF records, no.

Q Okay, and as we sit here today, I think we've covered -- 02:46PM

A Well, the ODAFF records, investigator records, things of that nature.

Q As we sit here today, you cannot identify a particular instance in which an employee of Tyson Foods or Cobb-Vantress or Peterson Farms or Simmons or George's has land applied poultry litter within the watershed? 02:46PM

A Not --

MR. GARREN: Object to the form.

A Not right at this moment. Well, let me think. You said again -- name those integrators again. 02:46PM

MR. GEORGE: Can you read it back?

(Whereupon, the court reporter read back the previous question.)

A Well, poultry waste within the watershed with respect to George's could be identified. 02:46PM

Q And the distinction you're making is that liquid poultry manure might not be poultry litter? I'm trying to understand the point.

A I think the common terminology is that it's the liquid waste as opposed to a dry waste. 02:47PM

Q Okay.

A But if we could just agree -- I guess we could agree to not differentiate them. That would be fine, too. 02:47PM

Q All right. Let's go back for just a moment to Table 6 on Page 24, which is the table that supports your 354,000 ton annual estimate of poultry litter produced in the watershed; correct?

A Yes. 02:47PM

Q Okay. If we assume for a moment and for purposes of this question, at least, let's assume that that figure would be applicable for the period of 1999 through 2004, a five-year period, okay, 354,000 tons each year. That would mean that in 02:48PM that time period, if my calculator is correct, there would have been about 1.77 million tons of poultry litter produced; does that sound about right?

A Yes.

Q Okay. For that same period of record, 1999 to 02:48PM 2004, if you look at Table 8 and Table 7, how many tons of actual litter application in the watershed have you been able to document and quantify?

A I think, according to what we had discussed earlier about 300,000 tons total, but we know that 02:48PM these records are incomplete and inaccurate.

Q So you do not have accurate records that would allow you to offer an opinion as to the location of the missing 1.4 million tons of poultry litter produced in the watershed during that five-year 02:49PM

period?

MR. GARREN: Object as to form.

Q Is that fair?

A I think that's quite fair. We can see in these records that things don't add up, that there are too many chickens for the waste reported or that the waste reported in terms of stored, transferred off site or disposed is at dissidence with the total produced. They produce less than they dispose. 02:49PM

Q In the watershed? 02:49PM

A Yes.

Q All right. On Opinion No. 14, let's move on to it beginning at Page 34 of your report, I'll read your opinion. The mass of poultry waste generated within the Illinois River watershed but disposed outside the watershed is a minority of the waste generated within the watershed; correct? 02:50PM

A Yes. As contorted as that sentence might be, that is correct.

Q Okay, and your support for that statement, if I've read your report correctly, is the information supplied by George's regarding its own hauling, as well as information obtained from BMPs, Incorporated; correct? 02:50PM

A That's correct. 02:50PM